NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

VERTICAL DRAIN

(No.)
CODE 630

DEFINITION

A well, pipe, pit, or bore in porous, underground strata into which drainage water can be discharged.

PURPOSE

To provide an outlet for drainage water from a surface or subsurface drainage system.

CONDITIONS WHERE PRACTICE APPLIES

This practice is applicable in locations where the underlying strata can receive, transmit, or store the design drainage flow and other drainage outlets are not available and cannot be provided at a reasonable cost. The practice is applicable only in locations where a determination has been made that it is not contrary to state laws or regulations, and that it will not cause pollution of underground waters.

Conditions Where Practice Applies. *Vertical drains shall be used only for land suitable for drainage with subsurface drains. This practice shall not be used where surface water enters subsurface drains.*

PLANNING CONSIDERATIONS

Water Quantity

1. Effect on the aquifer recharge.

Discharged water may be a source of ground water recharge.

2. Effect on the water table.

Water tables may be raised near the vertical drain.

3. The effect on the volume of downstream flow to downstream users and uses.

The volume of surface water leaving the area is reduced.

Water Quality

1. The potential hazard to ground water quality from the discharge of drainage water containing dissolved substances.

2. The potential for land use changes that may impair aquifer quality.

There is a potential for the drainage water to carry dissolved substances that may lead to impaired aquifer quality. The conditions for practice application in the standard are written in such a manner as to minimize the potential for this contamination or aquifer degradation. However, land use changes and management may produce conditions that will lead to water quality degradation. Monitoring of land use and management conditions relative to the quality of disposed water is recommended.

DESIGN CRITERIA

The number and size of vertical drains shall be adequate to discharge the design drainage flow into the underlying stratum or strata. The number, size, and location of the drains shall be based on a field determination of the depth, permeability, porosity, thickness, and extent of the strata.

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The minimum diameter of shallow uncased wells shall be 24 in. and of deep cased wells, 4 in.

A suitable filter system, desilting basin, or other means for removing sediment from the water before it enters the well shall be provided.

Well casings shall be of adequate strength and longevity to serve planned needs.

Location . Vertical drains shall be located at points dictated by the best plan for the subsurface drainage system, unless substratum conditions fix the well location elsewhere.

Well Capacity. Vertical drains shall have an intake capacity greater than the yield rate of the contributing area. Capacity will be governed by leaching requirements and desired water table recession time. This rate can be computed based on data on crop tolerance, irrigation water quality and effective precipitation retained, or based on one and one-half gallons per minute per contributing acre (Qd = 0.05 gal per sq ft per day). This rate has been found to give satisfactory protection for local conditions using river water for irrigation.

Well Development. Wells shall be drilled, developed, and cased in accordance with Conservation Practice Standard 642, Water Well. In addition, materials shall be in accordance with specifications in Conservation Practice Standard 642, Water Well. Wells shall be tested for capacity before completion of appurtenances and subsurface drain installation.

Casing and Materials. Wells shall be cased. Materials shall be in accordance with the requirements specified in the NHCP and Texas Addendum Standard for Well (Code 642) – "Well Specifications for Materials."

Sediment Protection. Each well shall be protected from sedimentation by the use of a sand or silt trap between the discharge end of the drain line and the point of water entry into the well. The trap may be a sump constructed around the well, an offset sump, or a catch basin. Construction shall be of concrete or masonry. The minimum inside horizontal dimension shall be four feet. The minimum depth for silt storage shall be 10 inches. Drain discharge lines shall enter the sump or basin at an elevation above the normal water level however, to avoid turbulence, the free fall distance from the invert of the drain line well discharge to the normal water surface should not exceed one foot.

Provisions shall be made to prevent the entry of surface water and trash into the sump and well. An adequate service entry shall be provided for well maintenance and silt removal. The surface entry shall be covered or otherwise arranged to prevent a safety hazard. Other details, dimensions, and materials used shall be consistent with individual site conditions and sound design procedure.

INSTALLATION REQUIREMENTS.

Certification. The owner shall obtain from the driller a signed well driller's log and certificate documenting the well depth; quality, length, and size of casing installed; and length of well screen or casing perforated. For steel casing, this documentation will include wall thickness, weight per foot, and whether new or used. For PVC plastic casing, the certificate will include the manufacturer of the casing and markings on the casing. For polystyrene plastic casing, the certificate will include the manufacturer of the casing, markings on the casing, nominal diameter, wall thickness, and statement that the physical properties of the plastic material used in the casing equal or exceed those for Dow Chemical Company Styron 456 or Cosden 825-D polystyrene plastic.

A copy of the driller's log and certificate shall be furnished the Natural Resources Conservation Service and made a part of supporting records of the well.

Plans and specifications

Plans and specifications for installing vertical drains shall be in keeping with this standard, and shall describe the requirements for properly installing the practice to achieve its intended purpose.

APPROVAL AND CERTIFICATION

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PRACTICE STANDARD APPROVED:

/s/ JOHN W. MUELLER	06/25/02
State Engineer	**Date**

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